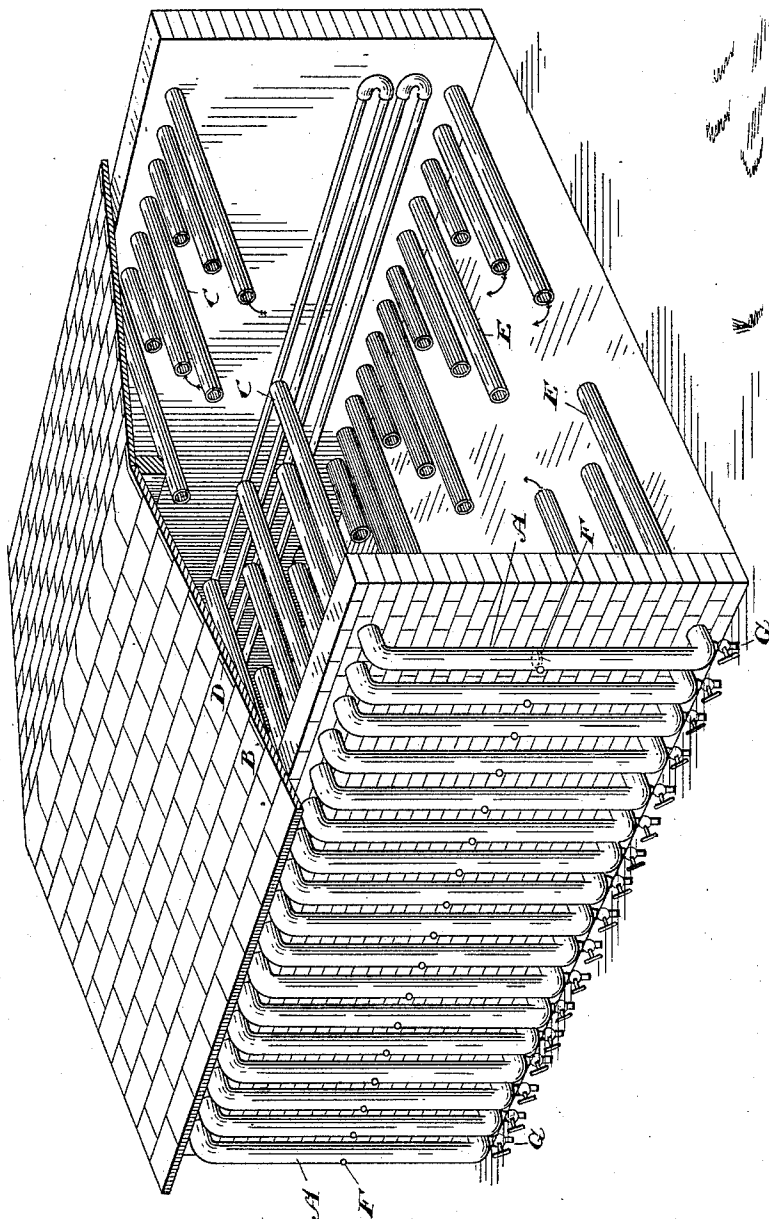


(No Model.)

J. S. PARMENTER.
DRYING KILN.

No. 469,268.

Patented Feb. 23, 1892.



Witnesses

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UNITED STATES PATENT OFFICE.

JAMES S. PARMENTER, OF WOODSTOCK, CANADA.

DRYING-KILN.

SPECIFICATION forming part of Letters Patent No. 469,268, dated February 23, 1892.

Application filed April 24, 1890. Serial No. 349,366. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. PARMENTER, manufacturer, of the town of Woodstock, in the county of Oxford, in the Province of Ontario, Canada, have invented a certain new and Improved Drying-Kiln, of which the following is a specification.

The invention relates to that class of drying-kilns in which the drying or like treatment is effected by continuously-maintained natural drafts of air—that is, the air is caused to circulate by reason of changes of its density, caused by variously submitting it to different degrees of temperature, as distinguished from those kilns in which the air is caused to circulate by mechanical devices—such as pumps, fans, and similar means. Such natural-draft kilns are usually employed at places and under conditions that practically prohibit the use of kilns operated by machinery—that is, where power is not to be conveniently had or where power would render the cost of the drying too expensive, particularly when the drying process is carried on continuously for a considerable time, or in cases where the natural air-draft process alone is properly effective, and in various other cases where similar conditions prevail.

Heretofore it has been proposed to effect circulation of air through the drying-chambers of kilns by the use of flues or flue systems variously connecting the floor or discharge-openings into the drying-chamber with the exhaust or ceiling openings leading out of the same. One such flue system consists of a series of separate vertical pipes arranged exteriorly to the drying-chamber, each pipe opening into the chamber at the top and bottom thereof through the side walls. Another such flue-system consists of delivery-openings through or at the floor and exhaust-openings through or at the ceiling of the drying-chamber, such openings being located at different distances from the side walls of the chamber, and a single side flue exterior to the drying-chamber and common to and connecting all the delivery and ceiling openings. Again it has been proposed to have floor and ceiling openings located at different distances from the side walls of the drying-chamber, and to have each of such openings connected by a single horizontal pipe with an exteriorly-lo-

cated vertical flue common to all the horizontal pipes or flues.

It is to be understood that the circulation is effected by the air in the vertical exterior flue or flues being cooled and so caused to descend, and to this end the interior of the kiln may be kept warmed while the exterior flues are kept cool by the circulation of outside air, or, if necessary, by other refrigerating means.

Each of the flue systems mentioned are ineffective in a natural-draft kiln to insure circulation of air throughout the whole of the drying-chamber. This is essentially due to the fact that the air in those structures will, when forced to circulate, take the nearest path to and from the vertical flue. Therefore the material to be treated is unequally acted upon, and that part or parts thereof located nearest the vertical flues will be soonest treated, while the portions near the middle of the chamber are unaffected, or at best incompletely treated.

It is the object of my invention to overcome this objection, and therefore to provide a natural-draft kiln with a flue system so constructed and arranged that separate currents of air are created exterior to the drying-chamber and caused to circulate through the chamber along different vertical lines, thus insuring the tendency of a draft or drafts in all parts of the chamber.

My invention consists of a drying-chamber having exhaust and delivery openings located at varying distances from the side walls, each exhaust-opening being connected to one of the delivery-openings by one of a series of pipes or flues, such pipes being independent of and disconnected from each other and their descending vertical portions being located exterior to the drying-chamber.

The figure of the accompanying drawing is a perspective view of a drying-kiln constructed in accordance with my invention, which view is one made merely for the purpose of illustrating the invention.

I wish it to be understood that the kiln may be made for drying lumber, wool, or other material.

In the drawing, A represents the series of vertical pipes, which are preferably made of light sheet metal and are located on the out-

- side of the building B, which constitutes the drying-chamber. Each pipe has a horizontal extension C, passing through the walls of the building B at points near the roof or ceiling
- 5 D. A corresponding extension E at the lower end of each pipe A projects into the building near its floor. The open ends of these extensions constitute, respectively, the ceiling or exhaust and the floor or delivery openings.
- 10 Steam-pipes are usually arranged near the floor of the kiln, as shown in the drawing, to heat the air, or other similar means may be employed.

When the kiln is in operation, the heated

15 air rises from the bottom to the top of the drying-chamber, and this creates a delivery into the drying-chamber from the open ends of the lower series of extension-pipes; also, an exhaust is created at the open ends of the

20 upper series of extension-pipes. The air drawn in at the exhaust-openings passes into the vertical extension portions of the separate pipes and is there cooled, which causes it to descend and be again delivered into the

25 drying-chamber.

- Drain-pipes G or other suitable means are provided for carrying away the moisture condensed from the air during its passage down the vertical pipes. Each vertical pipe is provided with a regulating-damper F, constructed
- 30 so that the individual pipes may be closed or opened to any desired extent to regulate the force of exhaust and delivery of air throughout the drying-chamber or locally in the same, as may be required. It is to be observed that
- 35 the horizontal extension-pipes are of different lengths, in order to locate the exhaust and delivery openings (the open ends of the pipes) uniformly over the ceiling and floor space.
- 40 With this arrangement of air pipes or flues, as air passes out of the delivery-opening of any lower extension-pipe a corresponding exhaust takes place at the other end of the same pipe

and the tendency of the air-currents is directly through the material being treated

45 from bottom to top of the drying-chamber. The arrangement of the material being dried of course determines the actual direction of the ascending air; but the essential end is gained of creating over the entire floor and

50 ceiling space a uniform and controllable delivery and exhaust of air. So, too, with the use of a series of vertical pipes adapted in size to the exhaust and delivery openings the downward currents of air have freer movement than when the currents from various

55 exhaust-openings commingle in one common vertical flue.

It is to be noticed that I provide but one exhaust and one delivery opening to each

60 pipe—the open ends of the horizontal extensions thereof. The openings into these extensions may of course be differently made; but it is essential that each pipe have in effect only one upper and one lower opening, in

65 order that the delivery and exhaust of any one pipe shall be at all times at substantially the same places relatively to the openings of the other pipes and irrespective of the force of the downward current in such pipe.

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What is claimed as new is—

The combination, in a natural-draft drying-kiln, of a drying-chamber, a series of separate vertical pipes A, located exteriorly to the

75 drying-chamber and having horizontal extensions C and E, opening into the chamber at the ceiling and floor and at different distances from the side walls of the same, whereby independent currents of air are caused to circulate through said pipes and through different parts of the drying-chamber.

80

Woodstock, April 10, 1890.

JAMES S. PARMENTER.

In presence of—

A. MEARNES,

GEO. W. PATTERSON.